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EXAMINER	
ALLI, IYABO	

ART UNIT	PAPER NUMBER
2877	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,486	ISHIKAWA ET AL.	
	Examiner	Art Unit	
	IYABO S. ALLI	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-36* is/are pending in the application.

4a) Of the above claim(s) *1-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _____ is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/23/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks on pages 7-10, filed on June 26, 2008, with respect to the rejection(s) of claim(s) 19-36 under 112, 2nd paragraph and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art reference **Kohama et al.** (2002/0158198).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **19, 20, 24, 25 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kihira** (5,691,811) in view of **Kohama et al.** (2002/0158198). ('**Kohama**')

As to claim 19, Kihira discloses irradiating an irradiation light having a predetermined pattern on an inspection target surface **3** (Column 4, lines 4-11 and Fig. 1); imaging the surface **3** irradiated with the irradiation light (Fig. 1); and inspecting the inspection target surface **3** based on an obtained image of the inspection target surface **3**, and the inspection target surface **3** is inspected based on lightness/darkness

information of an image area in the obtained image corresponding to a non-irradiated area in the inspection target surface **3** (Column 4, lines 39-46 and Figs. 2 and 6A).

Kihira *fails to disclose* wherein the irradiation light irradiated from an irradiation face has a mesh-like pattern including meshes of a same shape, each mesh having an irradiation area smaller than a non-irradiation area in a plane normal to an optical axis.

However, **Kohama** teaches wherein the irradiation light irradiated from an irradiation face has a mesh-like pattern including meshes of a same shape, each mesh having an irradiation area smaller than a non-irradiation area in a plane normal to an optical axis (Page 7, paragraph 128 and Figs. 13c and 16).

It would have been obvious to one skilled in the art at the time of the invention to include the mesh-like pattern of **Kohama** in the inspecting method of **Kihira** in order to isolate specific defects on the surface under test, by focusing on imperfections of different characteristics found within a symmetric pattern of illuminated light and not just a large band of beams without any defined shape.

As to claim 20, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses wherein if an image obtained is a normal obtained image when the irradiation light is irradiated on a normal inspection target surface **3** and a brightness of the irradiation area in the normal obtained image is defined as a high brightness whereas a brightness of the non-irradiation area is defined as a low brightness; then, an intermediate brightness area which is present within the obtained image and which is an area of intermediate brightness between the high

brightness and the low brightness is used as a target area **3** (Column 4, lines 52-68 and Fig. 3A).

As to claim 24, Kihira discloses an irradiating means for irradiating an irradiation light having a predetermined pattern on an inspection target surface Column 4, lines 4-11 and Fig. 1 (Column 4, lines 4-11 and Fig. 1); an imaging means for imaging the inspection target surface **3** irradiated with the irradiation light (Fig. 1); and an image processing means **5** for effecting an image processing on an image obtained by the imaging means, and the image processing means **5**, in the image processing, processes lightness/darkness information of an image area corresponding to a non-irradiated area in the inspection target surface **3** (Column 5, lines 7-15 & 27-33 and Fig. 4C).

Kihira *fails to disclose* wherein the irradiating means irradiates, from an irradiation face thereof, an irradiation light having a mesh-like pattern including meshes of a same shape, each mesh having an irradiation area smaller than a non-irradiation area in a plane normal to the optical axis.

However, **Kohama** teaches wherein the irradiating means irradiates, from an irradiation face thereof, an irradiation light having a mesh-like pattern including meshes of a same shape, each mesh having an irradiation area smaller than a non-irradiation area in a plane normal to the optical axis (Page 7, paragraph 128 and Figs. 13c and 16).

It would have been obvious to one skilled in the art at the time of the invention to include the mesh-like pattern of **Kohama** in the inspecting method of **Kihira** in order to isolate specific defects on the surface under test, by focusing on imperfections of different characteristics found within a symmetric pattern of illuminated light and not just a large band of beams without any defined shape.

As to claim 25, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 24 above **in addition Kihira** discloses wherein if an image obtained is a normal obtained image when the irradiation light is irradiated on a normal inspection target surface **3** and a brightness of the irradiation area in the normal obtained image is defined as a high brightness whereas a brightness of the non-irradiation area is defined as a low brightness (Column 4, lines 39-46 and Figs. 2 and 6A); the image processing means **5** includes an intermediate brightness area extracting means for extracting an intermediate brightness area which is present within the obtained image and which is an area of intermediate brightness between the high brightness and the low brightness (Column 5, lines 7-15).

And as to claim 27, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 24 above **except for** wherein the irradiation light of the irradiating means is formed through transmission between narrow slits distributed in a mesh-like pattern.

However, **Kohama** teaches wherein the irradiation light of the irradiating means is formed through transmission between narrow slits distributed in a mesh-like pattern (Page 7, paragraph 128 and Figs. 13c and 16).

It would have been obvious to one skilled in the art at the time of the invention to include the of **Kohama** in the inspecting apparatus of **Kihira** in order to isolate specific defects on the surface under test, by focusing on imperfections of different characteristics found within a symmetric pattern of illuminated light and not just a large band of beams without any defined shape.

4. Claims **21-23, 26** and **28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kihira** (5,691,811) in view of **Kohama** (2002/0158198), as applied to claims above, and further in view of **Yoshida et al.** (5,963,328). (‘**Kohama’** and **'Yoshida’**)

As to claim 21, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 19 above **except for** wherein an image area corresponding to the irradiation area in the inspection target surface is extracted as continuous light areas, and the continuous light areas are precluded from a target area.

However, **Yoshida** teaches wherein an image area corresponding to the irradiation area in the inspection target surface **10** is extracted as continuous light areas, and the continuous light areas are precluded from a target area **10** (Column 10, lines 57-62 and Figs. 1 and 6).

It would have been obvious to one skilled in the art at the time of the invention to include the extraction method of **Yoshida** in the defect inspection method of **Kihira** in view of **Kohama** in order to accurately determine where the imperfections occur and to be able to differentiate between defects and non-defects.

As to claim 22, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses wherein the image area corresponding to the non-irradiated area of the inspection target surface **3** is extracted for each enclosed dark area, and if an isolated light area is present within the enclosed dark area, the isolated light area is determined as a target area **3** (Column 5, lines 7-15 and Fig. 1).

As to claim 23, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kohama** discloses to the mesh-like pattern distribution of the irradiation light from the irradiation face corresponding to a shape of a surface (Page 7, paragraph 128 and Figs. 13c and 16).

Kihira in view of **Kohama** ***fails to disclose*** wherein in case the inspection target surface is a curved surface and the curved surface of the inspection target surface is set as a circular or a regular polygonal mesh-like pattern in the obtained image.

However, **Yoshida** teaches wherein in case the inspection target surface **10** is a curved surface and the curved surface of the inspection target surface **10** is set as a circular or a regular polygonal mesh-like pattern in the obtained image (Column 10, lines 1-7 and Fig. 7).

It would have been obvious to one skilled in the art at the time of the invention to include the correspondence to the curved shape of the surface of **Yoshida** in the inspection apparatus of **Kihira** in view of **Kohama** in order to allow the apparatus to be used for uniform as well as non-uniform object under test, expanding the range of objects that can be inspected by the apparatus.

As to claim 26, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 24 above **in addition Kohama** discloses wherein the irradiation light of the irradiating means is formed by a plurality of light emitting elements distributed in a mesh-like pattern (Page 7, paragraph 128 and Figs. 13c and 16).

And as to claim 28, Kihira in view of **Kohama** discloses all of the claimed limitations as applied to Claim 19 above **except for** wherein in correspondence with a curved surface shape of the inspection target surface, the mesh-like distribution of the irradiation light from the irradiation face corresponding to the curved surface shape of the inspection target surface is set as a circular or a regular polygonal mesh-like pattern in the obtained image.

However, **Yoshida** teaches wherein in correspondence with a curved surface shape of the inspection target surface **10**, the mesh-like distribution of the irradiation light from the irradiation face corresponding to the curved surface shape of the inspection target surface **10** is set as a circular or a regular polygonal mesh-like pattern in the obtained image (Column 10, lines 1-7 and Fig. 7).

It would have been obvious to one skilled in the art at the time of the invention to include the correspondence to the curved shape of the surface of **Yoshida** in the inspection apparatus of **Kihira** in view of **Kohama** in order to allow the apparatus to be used for uniform as well as non-uniform object under test, expanding the range of objects that can be inspected by the apparatus.

5. Claims **29-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kihira** (5,691,811) in view of **Yoshida et al.** (5,963,328). ('**Yoshida**')

As to claim 29, Kihira discloses an imaging camera **3** for imaging an inspection target surface **3** irradiated with an irradiation light of the light emitting elements **1** (Column 4, lines 4-11 and Fig. 1); and an outputting portion for outputting obtained image information of the imaging camera **4**, wherein the layout pattern comprises a continuous arrangement of the light emitting elements **1** thereby leaving a dark face of a predetermined shape therewithin (Column 5, lines 7-15 and Figs. 1 & 5A-5C); and the imaging camera **4** is disposed so as to receive, on at least one dark face, the irradiation light of each light emitting element **1** reflected off the inspection target surface **3** (Column 4, lines 57-62).

Kihira *fails to disclose* a plurality of light emitting elements arranged in a predetermined layout pattern.

However, **Yoshida** teaches a plurality of light emitting elements **11, 13** arranged in a predetermined layout pattern (Column 8, lines 38-42 and Fig. 1).

It would have been obvious to one skilled in the art at the time of the invention to include the plurality of lights of **Yoshida** in the inspection apparatus of **Kihira** in order to illuminate large objects under test faster, allowing more objects to be inspected in a shorter time.

As to claim 30, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses a defect evaluating portion **4** for detecting a defect on the inspection target surface **3** by evaluating an output signal from the outputting portion (Column 4, lines 29-34 and Figs.1 & 3A-3D).

As to claim 31, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses wherein the layout pattern **2** comprises a repetitive pattern which repeats itself along a predetermined direction (Figs. 6A-6C & 7A-7C).

As to claim 32, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses a conveying mechanism for moving the inspection target surface **3** along a direction relative to the plurality of light emitting elements **1** and the imaging camera **4**; wherein a direction of repetition of the layout pattern comprises the direction of relative movement (Column 4, lines 20-26 and Figs. 1 and 9).

As to claim 33, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **except for** wherein a light emitting face of the plurality of

light emitting elements and an imaging face of the imaging camera are present in a common plane.

However, **Yoshida** teaches wherein a light emitting face of the plurality of light emitting elements **11, 13** and an imaging face of the imaging camera **12, 14** are present in a common plane (Column 8, lines 45-48 and Fig. 1).

It would have been obvious to one skilled in the art at the time of the invention to include the plurality of light emitting elements of **Yoshida** in the inspection apparatus of **Kihira** in order to eliminate possible interference during the illumination and detection steps within the inspection apparatus, insuring only accurate information is detected by the cameras.

As to claim 34, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **except for** a defect evaluating means for evaluating an output signal from the imaging camera, thus detecting a defect present on the inspection target surface; wherein the defect evaluating means includes an isolated point extracting portion for determining, as a defect candidate, a prominent brightness area isolated in a lightness/darkness image of the inspection target surface generated from the output signal, and a defect candidate discriminating portion operable to preclude, from the defect candidates, the defect candidate contained within an area indicative of light emitting images of the continuously arranged light emitting elements in the lightness/darkness image.

However, **Yoshida** teaches a defect evaluating means **103** for evaluating an output signal from the imaging camera **C2, C2**, thus detecting a defect present on the inspection target surface **10** (Column 13, lines 20-27 and Fig. 17); wherein the defect evaluating means **103** includes an isolated point extracting portion **S2** for determining, as a defect candidate (Fig. 6), a prominent brightness area isolated in a lightness/darkness image of the inspection target surface **F** generated from the output signal, and a defect candidate discriminating portion **110** operable to preclude, from the defect candidates (Column 16, lines 34-42 and Fig. 17), the defect candidate contained within an area indicative of light emitting images of the continuously arranged light emitting elements **L1, L2** in the lightness/darkness image (Colum 10, lines 58-61 and Fig. 5).

It would have been obvious to one skilled in the art at the time of the invention to include the extraction portion of **Yoshida** in the defect inspection method of **Kihira** in order to accurately determine where the imperfections occur and to be able to differentiate between defects and non-defects, improving calibration techniques within the apparatus.

As to claim 35, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **except for** a preprocessing portion for effecting an image processing such that a brightness level of the continuous light emitting image area in an actual inspection substantially agrees with a brightness level of a light emitting image of the continuously arranged light emitting elements obtained from a normal inspection target surface, the brightness level of the light emitting image obtained from a normal

inspection target surface being employed as a reference for generating the lightness/darkness image from the output signal of the imaging camera.

However, **Yoshida** teaches a preprocessing portion for effecting an image processing such that a brightness level of the continuous light emitting image area in an actual inspection substantially agrees with a brightness level of a light emitting image of the continuously arranged light emitting elements **L1, L2** obtained from a normal inspection target surface (Column 16, lines 60-67), the brightness level of the light emitting image obtained from a normal inspection target surface being employed as a reference for generating the lightness/darkness image from the output signal of the imaging camera **C1, C2** (Colum 9, lines 58-61).

It would have been obvious to one skilled in the art at the time of the invention to include the preprocessing portion of **Yoshida** in the inspection apparatus of **Kihira** in order to accurately determine where the imperfections occur and to be able to differentiate between defects and non-defects, improving calibration techniques within the apparatus.

And as to claim 36, Kihira in view of **Yoshida** discloses all of the claimed limitations as applied to Claim 19 above **in addition Kihira** discloses wherein a peripheral area including the prominent brightness area precluded from the defect candidate and an unnecessary image area such as a background **150** are integrated and masked as a defect determination non-target area relative to the obtained image; and a masking operation is effected by determining an isolated point area precluded

from the defect candidate together with an unnecessary image areas such as a background **150** as defect determination non-target area (Column 5, lines 51-57 and Fig. 8).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IYABO S. ALLI whose telephone number is (571) 270-1331. The examiner can normally be reached on M-Fr: 7:30am- 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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